Vision for Rangeland Research

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As the in-house research arm of the U.S. Department of Agriculture, the Agricultural Research Service has a mission to:

Develop new knowledge and technology needed to solve technical agricultural problems of broad scope and high national priority in order to ensure adequate production of high-quality food and agricultural products to meet the nutritional needs of the American consumer, to sustain a viable food and agricultural economy, and to maintain a quality environment and natural resource base.

The mission of the Agricultural Research Service's rangeland research program is to:

Develop scientific knowledge and provide technology to conserve the natural resource base, while enhancing the productivity, sustainability, and ecological health of the Nation's rangeland.

The wide open spaces we know as rangeland played an important part in our Nation's agricultural past. That importance is by no means diminished today. Rangelands continue to provide a wide array of goods and services such as:

- forage, water, and habitat for wild and domesticated animals
- water for municipal and industrial use
- open space for recreational activities such as hunting, fishing, camping, hiking, and observing wildlife

Since more than 50 percent of our land surface is rangeland, proper care of this national resource is a matter of national importance.

Today we are challenged by new questions about rangeland condition, arising from debates

over use of public lands and potential climate and environmental changes. Nevertheless, well-managed rangelands have proven to be a renewable resource that, when properly grazed, can repeatedly and without interruption provide people with food, fiber, and recreational activities.

Because rangeland science is a broad collection of many other natural and social sciences, it fosters a progressive research agenda. The strength of its scientists lies in their diversity and divergence of expertise. Ask an ecologist, an animal scientist, a geneticist, a climatologist, or an economist how our rangelands should be treated, and you'll get answers from a variety of perspectives. Factor all those answers together into an integrated analysis, and you'll appreciate the advantages of today's multidisciplinary approach. At the same time, there is widespread agreement among scientists that the overall vision for rangeland research is to ensure that these ecosystems remain healthy and sustainable throughout the United States.

The Fundamental Issues

Three fundamental and interlocking issues dominate the ARS rangeland research strategy:

- Sustainability and diversity
- Environmental stewardship
- Profitability

These issues come to bear on five areas of consideration:

- Water
- Soil-Plant-Animal-Atmosphere Interface
- Genetic Diversity
- Integrated Pest Management
- Integrated Production Systems

Water

Land use policy, management, and stewardship reflect responsible consideration of the ability of rangelands to provide high-quality water in sufficient amounts to fulfill on- and off-site requirements.

In the United States, rangelands are a major source of water. Research is advancing strategies for water management which will promote and safeguard the amount and quality of those water supplies. Scientists are:

- quantifying the impacts of rangeland management tactics and determining how they affect both the water cycle and erosion processes.

- developing computer models which simulate the interactions of various watershed management practices and land use practices.

Soil-Plant-Animal-Atmosphere Interface: an Ecosystems Approach

Wise use is integral to sustainable and productive ecosystems.

Herbivory is a natural process that affects the way ecosystems look and behave. Grazing by large herbivores can be used to manage ecosystems, ensuring their integrity over time. But research is needed to determine the impacts of grazing by both domesticated and wild species, and to disclose how these species interface with other components of the ecosystem. Scientists are:

- quantifying how soil microbes affect rangeland vegetation, including its resilience to grazing and climatic change.
- developing reliable ways to monitor how ecosystems respond to stresses—including both stresses brought about by nature and those induced by management.
- developing livestock production methods that are both profitable and environmentally sustainable.

Genetic Diversity and Improvement

Genetic stocks are preserved and protected. Improved plant species better serve as forage for domesticated and wild animals, improve the condition of disturbed and degraded land, and help maintain the rangeland as a desirable recreational locale.

Not only does a diversity of species help to stabilize an ecosystem, but a diverse array of genetic stock is a powerful tool for restoring degraded ecosystems. Research is needed to define and maintain the balance of nature as it relates to existing stocks of genetic resources, to development of new stocks by both traditional breeding and biotechnology, and to the Nation's rangeland goals. Scientists are:

- developing effective land management strategies to optimize genetic diversity.
- generating new plant materials from both indigenous and introduced stock.
- developing superior lines of livestock with an eye toward enhancing the condition of the ecosystem while at the same time maintaining or improving the condition of the animal.

Integrated Pest Management

Rangeland productivity is enhanced through environmentally safe control of poisonous plants, noxious weeds, and destructive insects.

Innovative research is needed to make certain that pest management strategies are both ecologically and economically sound and totally sustainable. Scientists are:

- identifying new biological control agents and developing strategies to manage poisonous and noxious organisms.
- developing safe, environmentally friendly pesticides that target pests effectively with minimal effect on other organisms.

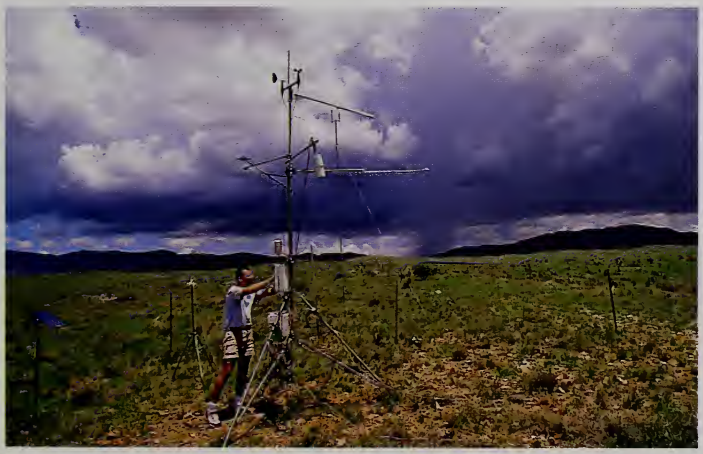
Integrated Production Systems

When rangeland production systems are ecologically sound, the results are increased profits to producers and resources that remain renewable, with an abundance of clean water, recreational opportunities, and enhanced quality of life.

Modern rangeland science provides the fundamental knowledge required to meet rangeland users' goals and objectives on a continual basis. State-of-the-art computer models allow scientists to watch the dynamics of rangelands over time. Digitized information can be obtained from satellites so potential changes can be reviewed under various scenarios, like prolonged drought or specific grazing management programs. Research to better define the ecological and social interactions of various multi-use strategies includes:

- multidisciplinary task forces that continually evaluate the biological, ecological, and social merits of established and emerging management plans.

- user-friendly, multifaceted decision support systems that help process, synthesize, interpret, and present information to resource managers for use on rangelands.



Expand Your Knowledge of Rangelands

Where do rangelands typically occur?

Rangelands are largely the result of limited precipitation. They are most often found in areas where the average annual precipitation is less than 30 inches—in fact, vast expanses of rangeland receive 15 inches or less.

Which lands meet the definition of rangeland?

For many years, rangelands were defined as lands supporting a natural vegetation cover of grasses, grasslike plants, forbs, or shrubs, and were managed as natural ecosystems. They included all natural grasslands, savannas, shrublands, deserts, tundras, marshes, and meadows. Today, though, the classification has been expanded to include lands that support introduced (i.e., non-native) species so long as they are managed as natural ecosystems.

How much of the United States is rangeland?

A little over one-half of all U.S. lands are classified as rangelands (1.2 billion acres). Likewise, approximately 60 percent of the entire landmass of the world is classified as rangeland.

Which State has the greatest amount of rangeland?

Entire United States: Alaska (233 million acres)
Lower 48 States: Texas (92 million acres)
East of the Mississippi River: Florida (2 million acres)

Which State has the largest percentage of its lands classified as rangelands?

Entire United States: Nevada (80 percent)
East of Mississippi River: Maine (7 percent)